

# The Impact of Balanced Scorecard to Strengthen the Competitiveness of Industrial Companies

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## Abstract

This research deals with balanced scorecard method as one of the management and evaluate strategic performance methods, their impact on achieving success in the competitive field of industrial companies, achieving competitive advantages through the company to outdo competitors' capabilities, coping with the growing dynamics of the competitive environments in which they operate, and ensuring the strengthening of the competitiveness of the company. The research problem can be formulated in the following question: Does the application of balanced scorecard method affect strengthening the competitiveness?". The researcher depends on an exploratory study by scanning the field for several companies in the engineering industries sector in Syria by using a questionnaire to determine the impact of balanced scorecard method in strengthening competitiveness. The most important findings of the resulting of the research:

1- There is a good positive and direct correlation between the balanced scorecard method and enhancing cost advantage.

2- There is a good positive and direct correlation between the balanced scorecard method and enhancing quality advantage.

3- There is a good positive and direct correlation between the balanced scorecard method and enhancing environmental advantage.

**Keywords:** Balanced scorecard, Cost Advantage, Environmental Advantage, Competitive Advantage, Quality Advantage.

## Introduction:

The rapid developments in the modern production environment, such as increased local and international competition, the speed of technological progress, the diversity of customer needs, and the short product life cycle, Showed inadequate traditional and management accounting methods to cope with these developments, therefore, they imposed new dimensions to the concepts of cost, the content of the measurement accuracy, and cost comparisons methods.

Those factors have led to the emergence of balanced scorecard method as one of the tools of management and evaluate strategic performance, which focuses on the hidden side of profitability, exemplified by the cost resulting from reducing the cost and rationalization of expenditure, provided that it is done from a strategic perspective that leads to the creation of greater value for the consumer; because adding extra value to the final product is considered strategic goal which is achieved through integration of the activities during the product life cycle starting from the product design stage and even after-sales service.

Therefore, this research deals with balanced scorecard method as one of the management and evaluate strategic performance methods, their impact on achieving success in the competitive field of industrial companies, achieving competitive advantages through the company to outdo competitors' capabilities, coping with the growing dynamics of the competitive environments in which they operate, and ensuring the strengthening of the competitiveness of the company.

## Research problem:

The research problem is the inability of many of the companies in the modern production environment to achieve strategic goals, and therefore the research problem can be formulated in the following question: "Does the application of balanced scorecard method affect strengthening the competitiveness?"

## The importance of research:

The importance of research comes from the following aspects:

A- The importance of research theoretically comes from the following aspects:

1- Managerial needs comprehensive and integrated information on all aspects of performance and costs associated with it to be able to run it in a way that leads raising competitiveness.

2-The growing importance of the balanced scorecard method as a way to manage strategic performance.

B- Practically, the importance of research comes in practically from the following aspects:

1- The need for the application of the research topic in the light of the increasing competition and rapid changes in the modern production world environment and the most important technological developments and its impacts on the reality of the industrial environment in Syria, particularly in the sector of engineering industries.

2- The importance of the engineering industries sector which forms 53% of the total industrial production sectors in Syria according to the statistics of the Ministry of Industry which consists of four basic sectors: engineering industries sector, chemical industry sector, food industry sector and textile industry sector, in addition to being one of the sectors most dependent on modern and advanced methods in the field of manufacturing and information systems.

### **Research objectives:**

Every successful management of any company should maintain competitive advantages, which are based on a unique strategy, because the strategic management of the performance oversees the success of the competitive company in the long term. So, the objective of the research is to study the impact of the application of balanced scorecard method on strengthening competitiveness.

### **Research hypotheses:**

Basing on the research problem and its importance and objectives, the research hypotheses were formulated in the following form:

1- There is not a significant correlation between the balanced scorecard method and strengthening competitiveness.

Ramifications for this hypothesis are the following sub-hypotheses:

1- There is not a significant correlation between the balanced scorecard method and the enhancing cost advantage.

2- There is not a significant correlation between the balanced scorecard method and the enhancing quality advantage.

3- There is not a significant correlation between the balanced scorecard method and the enhancing environmental advantage.

### **Research Methodology:**

The researcher, in the light of the importance, objectives and the hypotheses, depends on the descriptive analytical methods in the preparation of the research as follow:

- The first approach is based on extrapolation and analysis of literature (books, letters, Arab and foreign periodicals and researches on the international information network) related to the intellectual aspects of the research for the purposes of rooting scientific research topic.

- The second approach is based on devising a general framework for the subject of the research supporting the requirements of the application.

The researcher also depends on an exploratory study by scanning the field for several companies in the engineering industries sector in Syria by using a questionnaire to determine the impact of balanced scorecard method in strengthening competitiveness.

### **Research limits:**

Search limits include a range of spatial and technical limits as follows:

- Spatial limits: the field study was conducted on private engineering industries sector in the provinces of Damascus Countryside and Aleppo, whose capital exceeds 200 million Syrian pounds.

- Technical limits: the field study was limited to a variable of strengthening the competitiveness of only three variables, namely (enhancing cost advantage, enhancing quality advantage and enhancing environmental advantage).

### **Previous studies:**

1- **Toong Khuan Chan, Poh Tin Hiap (2012):**

Stakeholders of the Malaysian construction industry produced a Construction Industry Master Plan to chart the strategic direction for the industry for a ten year period between 2006 and 2015. The

objectives of this paper were to review the recommendations of the master plan using the Balanced Scorecard approach, to develop a performance management framework for the construction industry and to propose a set of performance measures to allow stakeholders to monitor the progress of the implementation of the master plan in achieving its strategic aims. The Balanced Scorecard approach was used to evaluate the critical success factors, strategic thrusts and recommendations to ensure that the master plan presents a balanced view to enhance the industry's competitive standing.

#### **2- Petera Petr, Wagner Jaroslav, Menšík Michal (2012):**

The goal of this paper is to publish the final results of our original empirical research into performance management topics among the biggest Czech companies from the viewpoint of a number of their employees. Specifically, we pay attention to the part of the research that was dedicated to the analysis of balanced scorecard and similar systems. The paper includes both a brief overview of relevant literature and discussion of the results of our empirical research. Firstly, we present various properties of performance measurement and management systems separately for BSC adopters and BSC non-adopters and compare these two groups of companies. Secondly, for BSC adopters we analyze properties of their systems and discuss obtained results.

#### **3- Hassan Darvish, Mostafa Mohammadi, Parviz Afsharpour (2012):**

This study clarifies the effect of knowledge management indices on the advancement of the four balanced scorecard perspectives. Intellectual Capital as a model of knowledge Management was the basis model in this survey. The samples were selected among managers, directors, officials and experts in Saipa Automotive Company. Data were collected via Questionnaire. The Pearson correlation, Friedman and linear regression tests have been used to analyze the data. According to the Pearson correlation test, the study showed a positive significant relationship between the knowledge management model and the four perspectives of Balanced Scorecard. It is of considerable importance that fact that Friedman test specifies all variables ranking then according to their importance and priority as follows: human capital in the first position, social capital in the second and structural capital in the third. Moreover, regression analysis represents accurate prediction and shows stronger correlation between KM and BSC. Overall, the present study suggests Product quality, Customer satisfaction and Staff satisfaction respectively as three important aspects of knowledge management in the strategic plan of SAIPA Company.

#### **4- Fawzi Al Sawalqa, David Holloway, Manzurul Alam (2011):**

This paper analyses the state of implementation of the balanced scorecard (BSC) among Jordanian industrial companies. From an economic perspective, Jordan is an exemplar of an advanced developing nation in the Middle Eastern region. The paper is part of a wider investigation into the usage of Western developed performance measurement diversity techniques in the Jordanian context. A quantitative survey of 168 companies provided insight into the level of implementation, diffusion and purposes for the use of the BSC approach among medium and large industrial companies. The results showed that 35.1% of the surveyed companies used the BSC approach. The finding also indicated that approximately a further 30% of the responding companies were either considering or currently implementing the BSC approach. The results revealed some inconsistency in terms of the types and number of BSC perspectives used. Companies that had implemented the BSC used different perspectives in their BSC with a greater focus on the original four perspectives as suggested by the original authors Kaplan and Norton.

### **The theoretical framework for research:**

#### **- The balanced scorecard concept:**

The BSC suggests that an organization's ability to create value in the future will be driven by four major perspectives as following (Darvish, et al, 2012):

**Financial perspective:** In many organizations, financial indicators are very important. These organizations are trying to increase revenue, reduce costs and risks and increase productivity via more efficient use of assets. In fact, obtaining good financial results in companies and economic institutions is necessary for their survival and growth. At the same time, the measurement and analysis of the financial results as a major function of the organization is a necessity in the study of organizational strengths and weaknesses

**Customer perspective:** Customer satisfaction as one of the most important business issues in today's world plays a role in many fields management, as most other indicators of product quality, price, waiting time and after sales service are in this regard. Professional organizations are looking for Customer satisfaction, because customer loyalty provides long-term interests for Organizations.

**Internal Process perspective:** The internal process perspective identifies those internal business processes that enable the firm to meet the expectations of the customers in the target markets and those of the shareholders.

**Learning and Growth perspective:** The fourth aspect of balanced scorecard, describes learning and growth, intangible assets of organizations and their role in the strategy. Organization can grow and innovate when it is able to develop its skills and leadership and also learn from its mistakes and other organizations'

behavior and be able to create new techniques for itself. Intangible assets are divided into *three categories*:

- human capital: skills, knowledge and talented staff;
- information capital: databases, information systems, networks and information infrastructures.
- organizational capital: culture, leadership, staff coordination, and teamwork and knowledge management.

In brief, the BSC describe the knowledge, skills and systems that employees will need (their learning and growth) to innovate and build the right strategic capabilities and efficiencies (the internal processes) to deliver specific value to the market (the customers), which will eventually lead to higher shareholder value (financial).

**-The concepts of competitiveness, competitive advantage and enhancing the competitive advantage:**

The competitiveness is defined as the skill, technique or the outstanding source which allow company to produce values and benefits for customers more than what the competitors can offer, and emphasizes its excellence and difference from those competitors' point of view who accept this difference and excellence because it brings them more benefits and values that are superior to what other competitors offer them.

The competitive advantage is defined as: the superiority of the company to competitors, resulting from the exploiting of the essential competences of the company in creating greater values in the form of low prices or unique advantages that satisfy the customers' needs and achieve their satisfaction.

The enhancing of competitive advantage is defined as: prolonging the usefulness of the application of a unique strategy to maximize the value, through acquiring competitive advantages which are difficult for competitors to be imitated.

The researcher believes that the enhancing competitive advantage requires the usage of the company strengths and unique capabilities to achieve the following:

- 1- Defending the company against the cases of imitation to its competitive advantage by other companies.
- 2- Maintaining the current competitive advantages and developing them.

**- Competitive advantages:**

There were many writers' and researchers' perspectives in identifying competitive advantages which can be clarified in table (1):

Table (1) competitive advantages, according to the view of some writers and researchers:

Table No. (1): the target sample, and the actual sample

Study	History	Competitive advantages
Wheelwright	<b>1987</b>	Low cost, superior quality, reliability of delivery
Koufteros et al	<b>1997</b>	Competitive pricing, quality value to the customer, delivery reliability and product innovation
Holweg	<b>2005</b>	Low-cost, quality, delivery reliability, and the timing of company to entry into the market
Albakri	<b>2008</b>	Cost, quality, flexibility and delivery
Dacey	<b>2007</b>	Low-cost, quality, speed of response to customers, response time and innovation
Alissa	<b>2009</b>	The lowest price, quality of service, responsiveness to customers
Altami	<b>2009</b>	Cost, quality, time, flexibility, service, environment

Source: prepared by the researcher.

The researcher believes that the difference of competitive advantages is due to the difference in the time period of each study and the different sectors that are being studied, and the study in this research will be limited to the competitiveness through the following competitive advantages:

**1- Cost advantage:**

This advantage relies on the ability of the company to provide service or goods at low cost compared to competitors and as a result getting a larger market share to the company.

**2- Quality advantage:**

The product quality is not just the removal of defects and shoddy, but it is an opportunity to search for a new method that adds a higher and greater value than the customers' expectations. It adds another burden which determines the customers' demands.

**3- Environment advantage:**

The environment advantage is one of the modern and important competitive advantages in light of the great interest in the environment, because there is a responsibility of the companies of what might impact the environment from the exercise of their activities, whether damages visible or invisible. Concern for the environment one of the company's responsibilities under laws relating to environment and which obliges companying certain obligations that it fulfilled

In addition to the growing expectations of the community and the regional and international levels on the company focusing on providing goods and environmentally friendly products.

The enhancing environment advantage includes several directions as follows:

- Operations and environmentally friendly products.
- Reducing waste and environmental responsibility.

**The field study:**

**Research community:**

The research community consists of directors of the following departments: public administration of the company, financial management, human resource management, production management and sales management in the companies of the engineering industries sector in Syria. The reason for choosing these departments is that they are the most important key departments in the company and which have a direct relationship in:

- The development of policies and strategies and monitoring their implementation.
- Product development and improving their quality.
- Study the market and competitors, customers' preferences and the extent of their satisfaction with company products.

**Sample research:**

A random sample of 265 people, spread over (53) companies operating in each of the provinces of Damascus Countryside and Aleppo was withdrawn. Five questionnaires were distributed in each company. The number of distributed questionnaires was (265), (224) questionnaires were restored, the other (21) questionnaires were excluded because of the lack of validity of the analysis, and therefore only (203) questionnaires were used in the analysis according to table (2):

Table No. (2): the target sample, and the actual sample

Number of questionnaires distributed	265
Number of questionnaires restored	224
Number of questionnaires excluded	21
Number of questionnaires used in the analysis	203

Source: prepared by the researcher

As it is shown in the above table, that the response rate has amounted to approximately 77% (203/265), this ratio is considered suitable for statistical analysis and a realistic outcome.

**The characteristics of the research sample (descriptive statistics):**

The researcher displays in this part the personal characteristics of the respondents of the sample which are based on their answers to the questions contained in the questionnaire within a paragraph of public information in terms of age, educational attainment, specialization and number of years of practical experience as follows:

**A - Sample distribution according to age group:**

Table (3) the sample distribution according to age group through the frequencies and percentage.

Age group	frequency	Percentage
30 years old and younger	21	%10.3
from 31 to 40 years	103	50.7%
from 41 to 50 years	46	22.7%
older than 50 years	33	16.3%
Total	203	100.0%

Source: prepared by the researcher based on the results of the statistical analysis of the questionnaire

The previous table shows that the percentage of the people aged (31-40 years) occupy first rank. When respondents rating by age group they accounted for 50.7% of the total sample size. The percentage of the people aged (41-50 years) has reached (22.7%) of the total sample size and the owners of this class came in the second place which means that a class of people aged (31-50 years) constitutes 73.4% of the total sample size. This age group is characterized with acceptable knowledge and skill, which gives a positive indication of the presence of a great deal of credibility with the respondents and then answers the questionnaire adequately and helps strengthening governance at the research hypotheses. The percentage of people over 50 years has come third at a rate of (16.3%) of the sample size. The last age group in the order was the class of the people aged (30) years old and younger accounted for 10.3% of the total sample size, which refers to the non-adoption of these companies to the younger age groups less than thirty years as director of companies engineering industries sector.

**B - Distribution of sample according to Qualifications:**

Table (4) shows distribution of respondents according to their qualification through the frequencies and percentages set forth in the following table:

Table (4): Distribution of the sample according to qualification

Qualification	Frequency	Percentage
BS degree	174	85.7%
Master	17	8.4%
Doctorate	7	3.4%
Other certificates	5	2.5%
Total	203	100.0%

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

The table shows that holders of BS degree occupy first place when respondents rating by qualification. The percentage of respondents carrying BS degree accounted to (85.7%).The percentage of respondents who hold advanced degrees in research sample (MS) was (8.4%) and the holders of this class came in second place. As for PhD holders, they came third by a ratio of (3.4%)which refers to the scientific level of the respondents who can answer scientifically the phrases in the questionnaire which enhances the credibility of the statistical analysis. The final category in the ranking is the respondents who hold the other certificates with percentage of (2.5%) and represented in certificates of vocational and technical institutes.

**C- The distribution of the sample according to the scientific specialization.**

Table (5): shows distribution of respondents according to the scientific specialization of the managers in the research sample.

Table (5): Distribution of the sample according to the scientific specialization.

scientific specialization	frequency	Percentage
Engineering	68	33.5%
Accounting	64	31.5%
Management	43	21.2%
Other specialties	28	13.8%
Total	203	100.0%

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

The Previous table shows that the percentage of specialists in engineering amounted to (33.5%) from the overall sample and occupied the first rank at the classification of the sample according to scientific specialization. The percentage of specialists in accounting amounted to (31.5%),and it amounted to (21.2%) in management whereas it amounted to (13.8%) in the other specialization such as humanities, law, education and sociology.

From the above mentioned ratios, notice that most of the respondents have a scientific specialization which enables them to answer the questionnaire as required which enhances the credibility of this tool.

**D –The distribution of respondents according to years of experience:**

Table (6) shows the distribution of the respondents according to years of experience of the research sample.

Table (6): Distribution of the research sample according to experience.

years of experience	Frequency	Percentage
5 years or less	8	3.9%
From 6 to 10 years.	98	48.3%
From 11 to 15 years	64	31.5%
More than 15 years	33	16.3%
Total	203	100.0%

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

The Previous table shows that the percentage of the years of experience up to 5 amounted to (3.9%) whereas the percentage of years of experience ranging from (6-10 years) amounted to (48.3%) and occupied the first rank.

The percentage of respondents whose years of experience range from (11-15) amounted to 31.5%, where as the respondents with years of experience more than 15 amounted to (16.3%).

From the previous percentages we notice that 96% of the sample exceeds 5 years of experience, which means that the majority of respondents have sufficient experience which enables them to answer the questionnaire that enhances the credibility of this tool .

**Test of validity and reliability of the tool used:**

It has been ascertained that the questionnaire prepared for this research is valid to measure what it has been prepared to measure and it includes all the elements that must be included in the analysis on one hand and the clarity of paragraphs and vocabulary on the other hand in order to be understood by the respondents through the following:

**A – Virtual sincerity:**

Virtual sincerity has been confirmed through the distribution of the questionnaire on the number of arbitrators to know the extent of its sincerity in the measuring of research variables. The number of arbitrators is (5) from the Faculty of Economics at the University of Aleppo. In the light of arbitrators' opinions some phrases have been modified, some have been deleted, some have been reworked and others have been added.

**B- The reliability of the questionnaire:**

Reliability testing was conducted on a sample research by using the coefficient of Alpha Cronbach. The Alpha Cronbach values mangle between (0-1) and in order to be characterized reliably, the minimum value for coefficient must be not less than (0,70).

Table (7) shows the results of the analysis of Alpha Cronbach coefficient for each part of the questionnaire.

Table (7): Alpha Cronbach coefficient for each part of the questionnaire.

Part of the questionnaire	The Alpha Cronbach value	Reliability evaluation	Ranking
Balanced scorecard	0.722	Acceptable	3
Cost advantage	0.709	Acceptable	4
Quality advantage	0.801	Acceptable	1
Environmental advantage	0.763	Acceptable	2
All parts	0.914	High	-----

Source: prepared by the researcher depending on the results of the statistical analysis of the questionnaire.

We notice from Table (7) that the value of Alpha Cronbach coefficient for the questionnaire parts ranging from (0.709) for the variables phrases part of cost advantage, and (0.801) for the variables phrases part of quality advantage. This means that the value of the Alpha Cronbach coefficient for all parts of the questionnaire is greater than (0.70). This indicates that the research tool characterized by internal consistency between its phrases. The value of the coefficient Alpha Cronbach for total phrases

questionnaire has reached (0.904) and this value is high which in turn indicates that the degree of stability is well characterized by the questionnaire which is valid for measuring what it has been prepared for.

**Testing hypotheses:**

Analysis of variance (ANOVA) has been used in the program SPSS18 in order to know whether the regression models used in the research is significant or not, and the study of the relationship between the factors extracted as independent variables on one hand and strengthening competitiveness as the dependent variable on the other hand when the level of significance is (5% ).

Hypotheses have been statistically tested by using SPSS 18, using the correlation coefficients between the independent variables and the dependent variable for each hypothesis which were tested by regression test in order to find correlation coefficients between dependent variables and independent variables to determine whether there is a correlation, and the strength of the relationship between these variables, and then the regression equations were prepared relying on the F-Test and T-Test to determine the degree of significance of regression equations and significance variables.

**1- There is not a significant correlation between the balanced scorecard method and enhancing cost advantage.**

To determine whether there is a significant correlation or not between the balanced scorecard method as the independent variable on one hand and the dependent variable (enhancing cost advantage) on the other hand, the regression analysis was performed and the results were as follows:

Table (8): The significant and definition of the regression model to the axis of Balanced scorecard method /enhancing cost advantage

Independent variable	correlation coefficient (R)	determination coefficient (R2)	F	Sig.	T	significant
Balanced scorecard method F	0.87	0.75	408.001	0.000	20.199	0.000
	Regression model estimated			B0	.590	0.000
				B1	.832	0.000

Source: Prepared by the researcher based on the results of the statistical analysis of the questionnaire

It is obvious from table (8) that the model representative of variables axis of balanced scorecard method / enhancing cost advantage is significant, because the value of Sig (F) (0.000) is smaller than (0.05).

The value of the correlation coefficient (R) which describes the strength of the correlation between the independent variable balanced scorecard method and the dependent variable enhancing cost advantage is (87%).This value indicates the existence of a good positive and direct correlation between the independent variable and the dependent variable.

The value of (T) calculated in absolute terms for the balanced scorecard method as an independent variable was (20.199) which is greater than the value of T spreadsheet.

Thus the null hypothesis that says "there is not a significant correlation between the balanced scorecard method and enhancing cost advantage has been rejected, whereas the alternative hypothesis that says" There is a significant correlation between the balanced scorecard method and enhancing cost advantage when the level of significance is 5%" has been accepted.

The value of the coefficient of determination R<sup>2</sup> shows that the information provided by the balanced scorecard method explains 75% of the improvement in the enhancing cost advantage which is a good and high rate.

From the above mentioned information the researcher was able to reach the estimated regression model equation and related to axis balanced scorecard method to enhancing the cost advantage which takes the following form\*:

$$Y_1 = b_0 + b_1F$$

$$Y_1 = 0.590 + 0.832F \dots\dots\dots (1)$$

\*-  $Y_1$  :The dependent variable in the regression equation which represents the enhancing cost advantage

-  $F$  The independent variable in the regression equation which represents balanced scorecard method.



**2- There is not a significant correlation between the balanced scorecard method and enhancing quality advantage.**

To determine whether there is a significant correlation or not between the balanced scorecard method as the independent variable on one hand and the dependent variable (enhancing quality advantage) on the other hand, the regression analysis was performed and the results were as follows:

Table (9): The significant and definition of the regression model to the axis of Balanced scorecard method /enhance quality advantage

Independent variable	correlation coefficient (R)	determination coefficient (R2)	F	Sig.	T	significant
Balanced scorecard method F	0.89	0.79	843.974	0.000	29.051	0.000
Regression model estimated				B0	.423	0.000
				B1	.890	0.000

Table prepared by the researcher based on the results of the statistical analysis of the questionnaire.

It is obvious from table (9) that the model representative of variables axis of balanced scorecard method / enhancing quality advantage is significant, because the value of Sig (F) (0.000) is smaller than (0.05).

The value of the correlation coefficient (R) which describes the strength of the correlation between the independent variable balanced scorecard method and the dependent variable enhancing quality advantage is (0.89%). This value indicates the existence of a good positive and direct correlation between the independent variable and the dependent variable.

The value of (T) calculated in absolute terms for the balanced scorecard method as an independent variable was (29.051) which is greater than the value of T spreadsheet.

Thus the null hypothesis that says "there is not a significant correlation between the balanced scorecard method and enhancing quality advantage" has been rejected, whereas the alternative hypothesis that says "There is a significant correlation between the balanced scorecard method and enhancing quality advantage when the level of significance is 5%" has been accepted.

The value of the coefficient of determination R<sup>2</sup> shows that the information provided by the balanced scorecard method explains 79% of the improvement in the enhancing quality advantage which is a good an acceptable and high rate.

From the above mentioned information the researcher was able to reach the estimated regression model equation and related to axis balanced scorecard method to enhancing the quality advantage which takes the following form\*:

$$Y_2 = b_0 + b_1 F$$

$$Y_2 = 0.423 + 0.890F \quad \dots\dots\dots (2)$$

**3- There is not a significant correlation between the balanced scorecard method and enhancing environmental advantage.**

To determine whether there is a significant correlation or not between the balanced scorecard method as the independent variable on one hand and the dependent variable (enhancing environmental advantage) on the other hand, the regression analysis was performed and the results were as follows:

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\* -  $Y_2$ : The dependent variable in the regression equation, which represents the enhance quality advantage  
 -  $F$  The independent variable in the regression equation, which represents balanced scorecard method.

Table (10): The significant and definition of the regression model to the axis of balanced scorecard method /enhancing environmental advantage

Independent variable	correlation coefficient (R)	determination coefficient (R2)	F	Sig.	T	signi ficant
Balanced scorecard method F	0.84	0.70	651.566	0.000	25.526	0.000
	Regression model estimated			B0	.466	0.000
				B1	.882	0.000

Source: prepared by the researcher based on the results of the statistical analysis of the questionnaire.

It is obvious from table (10) that the model representative of variables axis of Balanced scorecard method / enhancing environmental advantage is significant, because the value of Sig (F) (0.000) is smaller than (0.05).

The value of the correlation coefficient (R) which describes the strength of the correlation between the independent variable balanced scorecard method and the dependent variable enhancing environmental advantage is (0.84%).This value indicates the existence of a good positive and direct correlation between the independent variable and the dependent variable.

The value of (T) calculated in absolute terms for the balanced scorecard method as an independent variable was (25.526) which is greater than the value of T spreadsheet.

Thus the null hypothesis that says "there is not a significant correlation between the balanced scorecard method and enhancing environmental advantage has been rejected, whereas the alternative hypothesis that says "There is a significant correlation between the balanced scorecard method and enhancing environmental advantage when the level of significance is 5%" has been accepted.

The value of the coefficient of determination R<sup>2</sup>shows that the information provided by the balanced scorecard method explains 70% of the improvement in the enhancing environmental advantage which is a good rate.

From the above mentioned information the researcher was able to reach the estimated regression model equation and related to axis balanced scorecard method to enhancing the environmental advantage which takes the following form\*:

$$Y_3 = b_0 + b_1 F$$

$$Y_3 = 0.466 + 0.882 F \dots\dots\dots (3)$$

From the results of testing the previous three sub-hypotheses, the null hypothesis that says that "There is not a significant correlation between the balanced scorecard method and strengthening competitiveness" is rejected, whereas the alternative hypothesis that says "There is a significant correlation between the balanced scorecard method and strengthening competitiveness when the level of significance is 5%" is accepted.

**The results:**

- 1- There is a good positive and direct correlation between the balanced scorecard method and enhancing cost advantage.
- 2- There is a good positive and direct correlation between the balanced scorecard method and enhancing quality advantage.
- 3- There is a good positive and direct correlation between the balanced scorecard method and enhancing environmental advantage
- 4- Most of the companies work to monitor its market share by comparing the volume of sales over the years due to the lack of a database showing the amount of market share for similar facilities in the same sector. The researcher believes that this standard is not accurate because the sales decline or rise due to other reasons not related to the competition such as the global financial crisis.
- 5- Most of the managers in the companies of engineering industries sector believe that the least expensive

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\*-  $Y_3$  :The dependent variable in the regression equation, which represents the enhance environmental advantage

-  $F$  The independent variable in the regression equation, which represents balanced scorecard method.

way to reduce the cost of the product is through the continuous improvement of mutual relations between the basic activities of the company, through the reduction of waste and raising the level of quality.

6- Most of the companies of engineering industries sector do not have management or department for research and development, but they work on the import of equipment and Cutting-edge technology directly. The development process is limited to continuous improvement processes for activities without allocating a separate department for them.

7- Most of the companies are interested in applying the appropriate standards that qualify them to get the certificate of ISO 14001, because obtaining quality certificates make it easy for them to deal with the foreign companies. But they lack qualified staff, and modern and suitable laboratories to conduct the study and analyze the impact of environmental risks. These tests are usually done by governmental offices, not by the firm itself.

8- The interaction of the companies' managements and modern technological developments is weak, because of the high cost of acquiring of modern technology connected to the financial capacity of the company to make adjustments to production lines, and interest of company to have a reserve of industrial expansion.

### **The recommendations:**

Depending on the results of the field study in the engineering industries sector in Syria the following recommendations can be provided:

- 1 - The necessity of supporting and paying attention of senior management to apply balanced scorecard method to achieve their strategic goal and strengthen competitiveness.
- 2 - The necessity of developing information systems applied in the Syrian industrial companies to be efficient strategic information systems through the adoption of comprehensive modern entrances of cost management in order to achieve profitability targets and to strengthen their competitiveness. Because the application of balanced scorecard method cannot be discussed and applied in isolation of other modern methods and entrances, which cannot replace one another, but they are interrelated and must be employed in an integrated manner with each other.
- 3- The necessity to focus on the employees in the departments of finance and cost, to be scientifically and practically rehabilitated, and to develop their awareness of strategic systems concerning the importance of developing cost systems, and increasing their efficiency and competence to serve modern administrative purposes.
- 4- Creating comprehensive data bases that contribute in providing the necessary and appropriate data for the Syrian industrial companies, and support the application of modern management entrances such as market share, and benchmarking.
- 5- The necessity to focus on the factor of technological development and research and to raise their own funds, because the engineering industries companies depend basically on creativity and innovation.
- 6- The necessity of focusing on the environmental aspects, such as using environment friendly materials, and recycling the industrial waste, because it contains harmful substances to environment.
- 7- The necessity of focusing on customers' satisfaction through the survey and receiving complaints.

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### Questionnaire

Please tick the appropriate answer for you:

General Data:

Name: -----

Age	Answer
30 years and younger	
From 31 to 40 years	
41 to 50 years	
more than 50	

Qualifications	Answer
BS degree	
Master degree	
Doctorate degree	
Other certificates	

scientific specializations	Answer
Engineering	
Accounting	
Management	
Other specializations	

years of experience	Answer
5 years or less	
From 6 to 10 years	
From 11 to 15 years	
More than 15 years	

Please tick the appropriate answer:

First - The balanced scorecard method						
The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The management of the company takes interest in identify the financial strengths of the company.					
2	The management of the company uses financial resources as effectively as possible.					
3	The management of the company takes advantage of the mutual relations with suppliers in order to increase net profit.					
4	The management of the firm takes advantage of the mutual relations with customers in order to increase net profit.					
5	The management of the company has accurate data about customer's satisfaction.					

6	The management of the company explores customers' feedback about the quality of the product and the service provided by its.					
7	The management of the company tries to achieve satisfaction of existing customers.					
8	The management of the company tries to acquire of new customers.					
9	The management of the company determines activities and processes that are critical for the facility.					
10	The management of the company Improves the flexibility and the speed of their response to expected changes in the market.					
11	The management of the company tries to reduce breakdowns for each operational session.					
12	The management of the company tries to reduce the proportion of defective product					
13	The management of the company qualify and train employees constantly.					
14	The existence of an information system reduces the time of the delivery of information to management.					
15	The management of the company tries to continue modernization of machinery and equipment used in production processes.					
16	The company has a department for research and development.					

**The strengthening competitiveness:**

		The cost advantage				
The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
17	The management of the company tries to reduce waste and loss to the least extent in material costs.					
18	The management of the company tries to reduce waste and loss to a less extent in wages					
19	The management of the company tries to reduce waste and loss to the least extent in the industrial indirect costs					
20	The management of the company tries to reduce waste and loss to the least extent in marketing and administrative costs.					
21	The management of the company tries to reduce waste and loss to the least extent in storage costs.					

22	The management of the company tries to reduce waste and loss to the least extent in the cost of quality.					
23	The management of the company tries to reduce waste and loss to the least extent in environmental costs.					
24	The senior management evaluates the cost performance for sections, quarterly and annually.					

**The Quality advantage**

The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
25	The management of the company supports reducing the percentage of the defective and damaged products, compared with similar companies.					
26	The management of the company does its best to produce products that have specifications which identical to the standard specifications.					
27	The management of the company supports of the improvement of the quality of the product design.					
28	The management of the company supports the application of the requirements for ISO certification.					
29	Circulating of the quality standards to all the employees at the company.					
30	The management of the company enhances a awareness about the quality in the company.					

**The Environment advantage**

The Questions		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
31	The management of the company works on identifying activities related to environment in the activities of the company.					
32	The management of the company works on identifying costs related to environment activities in the company.					
33	The management of the company works on studying the alternatives available to the environmental treatments.					
34	The management of the company tries to study and analyze the impact of the environmental dangers.					
35	The management of the company works on applying the appropriate Environmental standards that qualify it to get a certificate of ISO 14001.					

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